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A new *Stigmella* species associated with *Lycium* leaf spots in northwestern China

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Abstract — A new anamorphic species *Stigmella lycii* on *Lycium chinense* is described and illustrated from Chinese material and compared with all known species of this genus. This is the first report of *Stigmella* species in China.

Key words — coelomycete, taxonomy

Introduction

While investigating medical plant diseases in Gansu province, China, during 2004 and 2011, a species of *Stigmella* Lév. was discovered that caused large, circular, necrotic leaf spots on *Lycium chinense* Mill. in Jingtai county. Severe infections caused by this pathogenic fungus usually resulted in premature leaf and fruit fall. Based on careful morphological examination, we determined that this pathogen represented a new species of *Stigmella*.

Materials & methods

The fungal specimens were cut by hand with a razor blade to make thin sections of conidiomata for microscopical observation. The sections were mounted in water and lactophenol cotton blue on slides. Morphological characteristics of pycnidia, conidiogenous cells and conidia were carefully examined using light microscopy. For scanning electron microscope (SEM) examinations, shortly after collection 5 mm squares of fresh leaf tissue containing conidiomata were fixed overnight at 4°C in 2.5% glutaraldehyde in 0.1M phosphate buffer (pH 7.2), washed with glutaraldehyde buffer, dehydrated in a 50-70-80-90-100% ethanol series for 15 min each, dehydrated in acetone, critical point dried, sputter-coated with gold, and examined in a JSM-6380 operating at 30 kV. The examined specimens were deposited in the Herbarium of Gansu Agriculture University (HGAU).

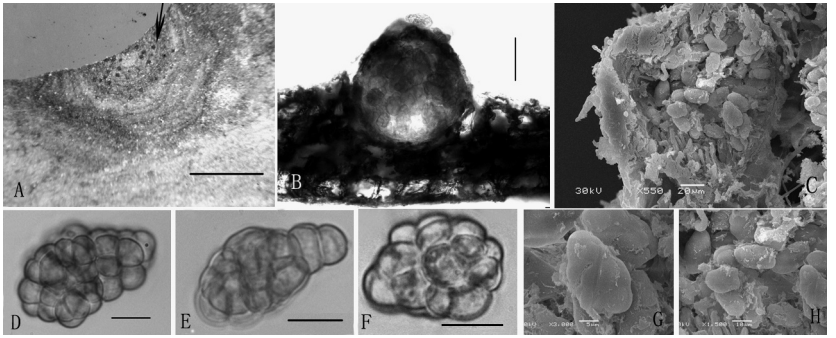

Plate 1. *Stigmella lycii.* A. Leaf lesion. Arrow indicating a single stroma. B–C. Section through a pycnidium with a layer of conidiogenous cells bearing conidia (B, by light microscopy; C, by SEM). D–F. Muriform conidia, by light microscopy. G–H. Muriform conidia, by SEM. Bars: A = 400 µm; B = 50 µm; C–F = 8 µm.

Taxonomy

Stigmella lycii X.R. Chen & Yan Wang, **sp. nov.** Plate 1.

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Differt ab omnibus speciebus Stigmellae pycnidiis *distincte majoribus et conidiis quoque majoribus.*

Type: China, Gansu province, Jingtai county, Damiao village, on leaves of *Lycium chinense* Mill. (*Solanaceae*), 22 October 2011, X.R. Chen & Y. Wang (**Holotype**, HGAU, Herbarium of Gansu Agriculture University).

Etymology: Epithet derived from the host genus.

Early lesions on leaves visible as small, round, pale brown leaf spots, gradually becoming larger necrotic blotches, somewhat zonate, with distinct margins, 2–8 mm diam. Lower leaves falling prematurely due to severe infections. Mycelium entirely immersed in the leaf tissue, septate, branched, hyaline to pale brown. Conidiomata pycnidial, immersed, erumpent at maturity, subglobose, blackish, 161–172 µm diam, with thin walls up to 10 µm diam, composed of one to three layers of small, pale brown to dark brown cells and an inner textura prismatica with thin-walled paler cells. Ostiole indefinite. Conidiogenous cells holoblastic, determinate, discrete, doliiform to ampulliform, hyaline, smooth, formed from the inner cells of the pycnidial wall. Conidia hyaline when young, at maturity pale olive-brown and muriform, oval, ellipsoid, pyriform, irregular and mulberry-shape, 19.9–52.8 × 12.8–32.9 µm, composed of 12–35 cells. Conidial cells small, irregular, subglobose, pale yellowish, 2.6–11.5 × 2.6–11.0 µm.

Discussion

The coelomycetous genus *Stigmella* has an intricate history. Its type species, *S. dryina* Lév. (Demidow 1842), was placed in the 'Phyllostictei' by Fuckel

(1870), along with representatives of *Coniothyrium* Corda, *Phoma* Sacc., *Darluca* Castagne, and other genera. Saccardo (1878) assigned '*Stigmella dryina* (Corda) Lév.' (an incorrect author citation) to hyphomycetes, a practice followed by subsequent authors. Bubak (1914) was the first to recognize the pycnidial structure of *S. dryina*. Hughes (1952), who conducted the first modern revision of *Stigmella* based on its type species, concluded from original descriptions that most species attributed to this genus were hyphomycetes and not congeneric with *S. dryina*. Sutton (1980) published a later description of the genus.

The two other species accepted in *Stigmella* are *S. effigurata* (Schwein.) S. Hughes (= *S. dryina*; = *S. dryophylla* (Corda) Lindau; see Hughes 1958) and the Indian *S. tirumalensis* Bagyan. et al. (Bagyanarayana et al. 1992). Based on conidioma structure, conidiogenesis, and conidial morphology, the recently collected Chinese fungus can clearly be allocated to *Stigmella* where it represents a third species, *S. lycii*, that is easily distinguished from the other species by much larger pycnidia and conidia with a distinctive cellular composition (Table 1).

Table 1. Comparison of *Stigmella effigurate, S. tirumalensis,* and *S. lycii*

	S. effigurata	*S. tirumalensis*	*S. lycii*
Pycnidia	≤100 µm	40–100 µm, rarely ≤200 µm	172–162 µm
Conidia	12–20 × 7–10 µm; 6 transverse + variable longitudinal septa	10–14 (–21) × 6–9 µm; ≤4 transverse & 0–3 longitudinal septa	20–53 × 13–33 µm, comprising 12–35 small cells (2.6–11.5 × 2.6–11 µm)
Host/ distribution	Leaves of *Quercus* spp., *Atriplex suberecta*, *Chenopodium* sp., *Eugenia* sp., *Senecio mesogrammoides*, *Stephania abyssinica* / Africa, Asia, Europe	Leaves of *Cassine glauca*/ India	Leaves of *Lycium chinense* / China

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